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NOTES ON CLIMATOLOGY.

BY

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CLIMATE OF MAMMOTH TANK, CALIFORNIA.—One of the most interesting places in the United States from the point of view of climate is Mammoth Tank, Cal., situated on the line of the Southern Pacific Railroad in the eastern portion of San Diego Co., and in the southern portion of the Colorado Desert. This station has gained a certain amount of distinction because of the statement in Greely's *American Weather*, page 138, that Mammoth Tank, Cal., and Camp Mohave, Ariz., "doubtless have the smallest-known rainfall on the face of the globe." While this is a somewhat misleading statement, yet, nevertheless, Mammoth Tank does possess a peculiar interest because of its very small annual rainfall. In the February number of *Climate and Crops: California Section*, there is an account of the Climatology of Mammoth Tank. From this account it appears that the mean annual temperature, based on records of 23 years, is 76.0°. July is the warmest month, with a mean temperature of 98.5°; and January is the coldest, with a mean of 53.9°. The highest temperature was recorded on August, 17, 1878, and was 130°, and the lowest was 22°, in December, 1895, giving an absolute range of 108°. Temperatures of 100° and over have been recorded in every month except January, February, November and December, and temperatures of 90° and above in every month of the year. Temperatures of 120° and over have occurred in the five months of May, June, July, August and September. The mean annual rainfall for 23 years is 1.81 inches. The greatest amount in any one year fell in 1889, and measured 5.48 inches; while in 1897 and 1898 there was only a trace during the whole year. The greatest monthly rainfall was 3.18 inches in December, 1889. In June the rainfall record for each one of 22 years is marked "0." Only once during the whole period of 23 years was there as much as a *trace* of rainfall during this month.

THE OLD YUMA TRAIL.—A graphic description of the climatic conditions of this same arid portion of our country is given by McGee in a paper on "The Old Yuma Trail," in the *National Geographic Magazine* for March and April last. The pathetic history of the loss of life along the Trail in the days of the gold fever is written in the numerous graves, which are noted on the route. And yet

> The roll will never be written in full, since most of the unfortunates left no records, scores leaving no sign save bleaching bones; but observers estimated that there were 400 victims of thirst between Altar and Yuma within eight years.

The desert vegetation, the sinks and playas, and a desert storm all come in for a share of the description. The storm, which gave twenty minutes of continuous downpour, yielded a precipitation which was estimated at 1½ to 1⅓ inches, and yet

> Over the waste of drifted sand not a rill was formed, not a puddle was produced, not even a watery surface was seen save in a few "slick spots" (*i. e.*, the alkaline silt patches) of the cowboys—the sand simply swallowed the flood like a sponge, and was visibly moist only to depths of 3 to 4½ inches.

Of peculiar interest are Las Tinajas Altas, a series of pot-holes or cataract pools worn in the bottom of a gulch by the torrents which are produced by the rare storms of that region, and containing water. These high tanks lie on the leeward side of a rugged range of hills, which is the first to intercept the moist current from the Gulf of California. This whole region, unattractive as it may seem at first sight to most persons, has been the scene of a most wonderful struggle and development of animal and plant life, as has been so well described by McGee himself in previous papers. The "unparalleled solidarity" of the life in the desert, as McGee has termed it, was developed because of the common struggle of all forms of life against the hard climatic conditions surrounding them, these conditions forcing animals and plants

> into a harmonious interrelation in which none could dominate without risk of starvation, none yield unduly without certainty of extinction.

CLIMATE OF MANILA.—A recent publication of the Jesuit Observatory of Manila contains a summary of observations of pressure, temperature, and humidity taken hourly during 1883–1898, and of rainfall taken during 1865–1898. From these tables it appears that the normal monthly and annual temperature, relative humidity, and rainfall are as follows:

	TEMPERATURE. (Degrees Fahr.)	RELATIVE HUMIDITY. (Percents.)	RAINFALL. (Inches.)
January	77.0	77.7	1.193
February	77.7	74.1	0.413
March	80.4	71.7	0.736
April	82.9	70.9	1.142
May	83.3	76.9	4.197

	TEMPERATURE. (Degrees Fahr.)	RELATIVE HUMIDITY. (Percents.)	RAINFALL. (Inches.)
June	82.0	81.5	9.622
July	80.8	84.9	14.567
August	80.8	84.4	13.866
September	80.4	85.6	14.925
October	80.4	82.6	7.536
November	79.0	81.6	5.126
December	77.4	80.7	2.134
Year	80.2	79.4	75.457

CLIMATIC DIFFICULTIES IN THE WAY OF THE PROPOSED RAILROAD TO INDIA.—Sir T. H. Holdich, in a recent article on "Railway Connection with India" (*Scottish Geographical Mag.*, May, 1901), points out very clearly some of the engineering and other difficulties which are to be met with along the various proposed routes for a railway to India. Among these difficulties that connected with the climate is given considerable prominence. Thus the region of the Hindu Kush presents vast, if not impossible, engineering problems to be solved, if ever a railroad is put through that region; and, furthermore, the violent storms of wind and snow, the avalanches of stones and mud, and the intense cold of the winter are stated to be beyond the possibility of successful conquest by any conceivable future principle of railway development. Again, the route along the coast from Persia would take the railroad through climatic conditions which for four or five months of the year are regarded as "insufferable," and this climatic objection the writer believes to be almost enough to be prohibitive, so far as this proposed line is concerned.

HINTS TO TRAVELLERS REGARDING METEOROLOGICAL OBSERVATIONS.—An article designed to supply travellers with the necessary instructions in the use of the ordinary meteorological instruments which they may carry with them is contributed by Dr. H. R. Mill to *Hints to Travellers, Scientific and General, edited for the Council of the Royal Geographical Society by John Coles* (8th edition, London, 1901). Dr. Mill has also gone a step further. Many travellers carry no instruments, but wish to make observations of some sort on the climatic conditions of the countries through which they are passing. The needs of this class of persons are met by Dr. Mill in a series of instructions designed to show how evidences of the climates through which the traveller's journey takes him may be obtained by noticing the effects produced by the climatic conditions upon the land, vegetation, human occupations, and the like. If all travellers were to follow some systematic and intelligent scheme of observations regarding meteorological phenomena we should have fewer vague and unreliable descriptions of the sort which now encumbers books and articles dealing with travel.

THE EFFECT OF THE WEATHER IN GERMANY ON THE AMOUNT OF NITRATE EXPORTED FROM CHILE.—The report of the director of the "Asociación Salitrera de Propaganda" for the year 1900 brings out a striking illustration of the effect of weather conditions in a distant country upon the amount of nitrate exported from Chile in that year (Bulletin Bureau of American Republics, April, 1901, 672). The decrease in the consumption of nitrate in Germany in 1900 amounted to 1,273,050 quintals. The reasons for this falling off are stated to have been connected with the weather conditions. In 1899 the weather in Germany was favourable to the growth of straw, and this resulted in the production of an unusual quantity of farmyard manure, which naturally entered into competition with the nitrate. Furthermore, late spring frosts in Germany also retarded the use of nitrates, and a long drought in the eastern part of the country prevented their use on the grass lands.